

Investigating electron precipitation events using near-conjugate observations from St John's, New Foundland and Halley, Antarctica

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A form of high energy particle precipitation into the atmosphere is EMIC-induced electron precipitation. In this study, we use a narrow-band radio receiver recently installed at St John's, New Foundland, Canada, as part of the AARDDVARK network, to investigate this particular type of electron precipitation. The aerial is located close to the site of the first successful trans-Atlantic subionospheric wireless radio signal reception made by Marconi in 1901. The AARDDVARK receiver can detect near-by perturbations in subionospheric radio wave propagation conditions caused by enhanced ionization in the altitude range 50-90 km. We present the results of an investigation of electron precipitation events during 2012 and 2013 using near-conjugate observations with Halley, Antarctica. Using the signal received from the LF transmitter located in Iceland (id: NRK, 37.5kHz) we detect changes in amplitude caused by electron precipitation events that can be linked to observations made at Halley via widebeam riometer absorption, or VLF wave occurrence, or the presence of electron magnetic ion-cyclotron (EMIC) waves.